An Inaugural Dissertation
on
Animal Life.

Submitted to the examination
of
John McDowell D.D. Provost.
The
Trustees and Medical Faculty
of the
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by
Walter Channing
of
Boston. Massachusetts.

Honorary member of the Philadelphia Medical Society, &c.

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On Animal Life.—

The following pages contain some remarks on Animal Life. I have ventured on this subject, not from mere opposition to the generally received sentiment concerning it. Veneration, & affection equally incline me to the contrary. But systems challenge investigation; and the good sense of their projectors reconciles them even to the severity of criticism. This last task is not the duty of a young man. Mine shall be only to express the difficulties which present themselves to me, even when endeavouring to coincide with those, whom, study & talents

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Life has been considered an Effect. That it is one, no rational being can deny. Creation in its utmost extent is an effect. God spake and there was light, & Life.

But Animal Life, that which presents us with such wonderful phenomena, on which man depends as a condition for making known to his fellow men the intricate windings of abstract speculation; on the possession of which alone he is enabled to investigate the secrets of nature; on which in short the final cause of his existence entirely depends is considered the Effect of secondary

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causes. I respect, I venerate the authors of the system, and anticipate their pardon for my presumption for withholding my assent to it. — —

An Effect *cæteris paribus*, must always result from the existence of a cause which ever has been attended with a similar effect. — Barbauld has taught and perhaps with much propriety, that a cause to be such, exists or is necessarily attended with its effect, that ~~they~~ they are simultaneous or coexistent, & the two words cause and effect result from that weakness of our understanding which can view ~~things~~ ideas & occurrences only in succession. That it is not what will be, but what really is, ~~followed~~ followed by a particular result, that is

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a cause. Now one of the causes or stimuli of life is air. A ~~[illegible]~~ question now naturally presents itself. If life has ever been the result of this stimulus, why are we not able by the same means to reanimate a lifeless body? Why do we not breathe and bid the phenomena of life appear? —

It is answered that a capacity is absolutely necessary for the effects of the stimulus to appear which uniformly have appeared when that capacity existed it, the stimulus being presented. What are we to understand by this capacity? On the new theory it can only mean a certain condition of some parts of the system calculated to be acted on, by certain stimuli,

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on the action of which certain effects shall be produced in those parts which shall become causes, productive of other effect, viz the wonderful phenomena resulting from the operations of the Animal economy,

But is this the case? If Barbaneke correct, does not the failure of experiments instituted for the recovery of those suffering under asphyxia for instance, leads us to doubt of the assertion that air is the cause or stimulus of Life? Further. In order that air should become a stimulus of Life, it must enter the lungs. The lungs must have been originally prepared for ~~this~~ its reception. If they were a vacuum, by a Law imposed on air, it

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must have necessarily entered them, and the phenomena of life must have followed. Had the human lungs been constructed as I have supposed, there could have been no natural necessity for ~~for~~ a supernatural interposition of the Deity for the production of the Life of man—

Life and its wonderfull effects were all the attributes of the vast range of of the brute creation, long before the creation of man, and the subjects of it were prepared to prostrate themselves before this last best work of the Deity.—Could contractility, irritability, sensibility, the circulation of the blood, which is consolidated by rest, could animal ~~life~~ heat, finally

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be the accidental results of one lifeless, inert stimulus? we are told that God breathed into Man. If this merely means the entrance of air into the Lungs, what according to the nature of things would have been the result? The lungs which before were either a preternatural vacuum, or naturally compressed, not possessing any peculiarity from other matter, must necessarily have been left in the same situation with matter in generall, the equilibrium being restored, nothing farther could take place, But this is not the case, By the expansion of the air vessels of the Lungs, the blood vessels become permeable, the blood leaves its prison (the heart), enters the expanded

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lungs, reenters the heart, and thence commences its wonderful circulation, dispensing life, heat, and vigor through the most minute portions of the system. —

But is there not something more necessary than the mere entrance of the air into the lungs, that the phenomena of respiration &c may ~~[illegible]~~ take place? I conceive there is. Muscular motion is a phenomenon as striking as respiration; in fact respiration depends on is the result of it; ~~The~~ thorax must be enlarged; which can only be effected by the peculiar properties of the muscular fibre. From whence is this peculiarity of muscle derived? Muscles for the purposes of

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voluntary motion, are under the influence of stimuli even when seperated from the body. But what does the motions of muscles not dependant on the will depend? On a connection with a part of the system, essentially different from any other part as to structure; insensible though the seat of sensibility destitute of contractility though the source of this & every other function of the body. This surpassing portion or connection with which so much depends of the system is the Brain. From whence did the Brain, derive such peculiar properties? Surely not from stimuli; for before the system can be susceptible of the action or impression of stimuli, before then necessary, appropriate effects can

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result a brain is necessary. I a connection of each part of the body, which is destined to the performance of any function, must exist between such part and the Brain.—

No stimulus can act on the brain through the medium of other parts, unless their susceptibility of such action, or power of acting, had previously been derived from the Brain.—

That this power or property viz life so peculiar to animal mate is intelligent I do not even imagine, But that it is one which distinguishes it from all other kinds of matter or existences whatever, whose peculiarities are the results of accidental or mechanical arrangement, I do not hesitate to believe. It is a power or principle, but like all others in nature it acts necessarily.—

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when, in its perfection it appears to be a "power by the energy of which various species of matter are converted to one kind under one system, so that the matter thus converted has the power of resisting the operation of external causes & of preserving itself from decomposition and decay". — And thus essentially differing from common matter. It is a power constantly exerting itself for the nourishment & defence of the subject in which it resides; it is a quality which renders the subject of it specifically different from all known matter. — The belief that life is an effect is founded on the definition, that some have given it — viz that it is an aggregate of all the actions or functions of the animal phenomena, which result

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from the impression of stimuli on an aptitude in the system to be acted on, called also excitability.— This being admitted Life is said to be a forced state. Now, as long as an aptitude of this kind remains the phenomena of life must appear; whenever causes are applied calculated to produce such effects. But we find this not to be the case; innumerable instances of suspended animation where the process of decomposition could not have taken place, are on record in which the benevolence of humanity has prompted to the noblest exertions to restore the animal functions without success. Farther, on the new theory, the aptitude for life is in a di

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direct ratio to the destruction of stimuli; but universal experience testifies that resuscitation is difficult in proportion to the ~~period~~ length of the time of suspended animation, so that the cause of increased aptitude for life is the most certain instrument of its destruction. —

This aptitude must, I conceive, be the result of of some peculiarity of ~~arrange~~ ~~ment~~ matter as it respects its arrangement, It has been asserted to be such. The affinity of matter with matter, has been considered the cause, the sole cause of the adaptation of animal matter for the action of stimuli or causes producing life. From this doctrine, theories have

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ciness as will as those which the imagination of a Paracelsus framed; and perhaps as offensive to the Deity. I pass them by in silence.—

I hope I shall be permitted to dwell on the doctrine. When I enter on the subject of the Oxygenous Philosophy, I feel that I am entering on ~~a~~ one concecrated by the best talents of the greatest men. I find enrolled in its defence not only names the subjects of which have mouldered away, but likewise of those, who live the objects of my respect and regard. Their opinions are founded on a science which should be, it is, among the noblest employment of the Physician. It has placed in his hands, instruments, yes weapons by which he prostrates disease at his feet.

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I anticipate pardon, if warmth should exceed ability; I hope for it if respect for opinion should give place to the investigation of system. — Granting that Jupiter-position, the effect of affinity, is the circumstance which distinguishes animal matter from all other matter; this affinity must be under the influence of certain Laws — be rather within a certain sphere only can it act; and only on certain objects — I cannot conceive of this to be an assimilating principle. Can this then account for the results which take place from animal processes. Can it allow for the power of preservation which animal matter passes? Is it by this that man becomes the inhabitant of every climate, ? or is it believed that it adapts itself ~~not~~ to circumstances though it be admitted to be under

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the influence of laws! — By the perfection of animal life matter the most heterogeneous are converted into one possessing exactly the same sensible qualities, & exhibiting the same by chemical analysis. — One and the same law, limited & unchangeable, under circumstances the most opposite is asserted to be the cause of uniformly the same effects. —

The affinity of oxygen with the animal fibre is assumed as the cause of that peculiarity, by which the different parts of the structure are enabled or capacitated to perform their general functions. — But how on this doctrine can we account for the peculiarities of the fatal state of animal existence? — This presents us with growth, this is the effect of nourishment. Nourishment is the effect of assimilating powers, & these of structure

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intricate almost beyond explication. Possessing with all the preservative power as perfectly as the adult. We will consider the fœtus as perfect in its parts. Now from whence does the little animal derive its powers of irritability, contractility, and its actual motion? It is answered, from the affinity between oxygen and the animal fibre, there results a combination ~~fatal~~ from which results a capacity ~~for~~ from which such peculiar effects are to follow. ~~to be proceeded~~

But through what medium is this combination effected? How are these selfattracting objects brought within the sphere of their respective attractions or affinities? Through the medium of circulating blood. Blood deriving its oxygen from the atmosphere, that being taken into the lungs of

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the mother, and then conveyed to the fœtus by a direct connection of the fœtus with the mother?

No. A direct communication has never been demonstrated. Injections pass readily & directly from the umbilical arteries to the umbilical vein. No vessel constituting a connection between the mother & fœtus, has been demonstrated. * —

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* The following case will very doubtful it is that a connection exists between the mother & fœtus. Mr Shelly & Myself were this winter engaged in an obstetric case. It was a foot presentation, the child was destitute of respiration for upwards of an hour after delivery, inflation of the lungs was practised frequently during the first 15 minutes, when the placenta being delivered, that with the child was removed to a tub of warm water in 45 min or more the phenomena of life began to appear — The chord exhibited the usual appearance of venous & arterial blood at the place of division — The difference in the fœtal from the adult blood is known; & difference in the pulsation of the arteries of the fœtus & those of its mother is admitted by all. —

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Before this was found to be the true state of things by experiment, the system we are now considering might have had some degree of plausibility from such a connection being supposed actually to exist. But these facts being known a serious difficulty presented itself to J. Bell. the celebrated Anatomist & surgeon of London. He found that oxygen could not through the medium of the blood enter the fœtal system. — To remove this, he avails himself of a petitio principii, asserting that there is a something secreted by the Uterus which enters the placenta and brings along with it the oxygen in a concrete form. I would now ask how can oxygen acquire this form? Does it, in the Uterine circulation, meet with parts, which are destitute of caloric

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to which it yields that which it is supposed to possess, & thus become concrete ? If he does not suppose the oxygen enters the uterus in a gaseous form but only by its connection with the iron of the Blood, produced by its previous union with the Phosphorus it meets with in the blood, forming with it an acid, & that with the iron forming a salt – on what chemical process can we suppose it to break loose from matter with which it affinity has so closely connected it ~~with~~, & from which circumstance the iron must be revised, to assume a ~~gaseous~~ concrete form; combine with a secretion of the uterus (which perhaps does not exist), then leave that and finally enter the placenta, & thus accomodated enter the circulating system of the fœtus. – —

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Such is the theory of Mr J. Bell. I think it could not have arisen as in another less careful observer it might have done, from the ~~simple~~ contemplation of the human gravid uterus. But we find even in this that the fœtus acquires some size before there is any the smallest attachment of the fœtus to the mother. In some quadrupeds, as in the horse for instance, ~~in which~~ the fœtus acquires considerable ~~growth~~ size before any connection whatever takes place between that and its mother, any other than being ~~connected~~ contained in a sack, which is filled with a fluid demonstrated to contain not a particle of nutriment, and useful only as it prevents undue pressure of any particular part of the parietes of the sack. In some animals the placentulæ (for they are numerous & small,) ~~they~~ are attached

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By what means can Oxygen then arrive at the fibre of the fœtus, and endow it, with its wonderfull properties? Will it now be said from contiguity of parts? the arterial blood of the mother yielding it to the venous blood of the fœtus for which it is said to have such a strong affinity, while passing through the placenta?

What is the state of the circulation in the uterus? The venous plethora exists. How then can we account for that remarkable portion of oxygen sufficient to the oxygenation of its own & the fœtus's blood? And if it be admitted that contiguity of parts will account for the oxygenation of the blood where is the necessity for the bloods circulation? where in short is the necessity for respiration? —

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That oxygen produces some changes in the blood no one can deny. It changes the modena red of venous blood to a fine florid color. But it has the effect on animal substance long deprived of the properties which life endows it with, on blood drawn from a vein. Here it is a coloring principle. Plants however lose their color while under its sole influence. It likewise has its effects on unorganized matter. So that its coloring property acts only as circumstances favorable to such action are present. No one can deny the indispensible demands of the system for air possessing oxygen. But without respiration, and without any known medium for the passage of oxygen into its system, the fœtus lives, viz grows &c & has its colour of precisely

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the same colour with that, which is constantly under the influence of oxygenated air. In fact without any communication with oxygen the fœtus presents us with a circumstance ~~which~~ which must lead us to suppose (if oxygen have the effects ascribed to it) that it (i.e the fœtus) receives or possesses a larger portion of oxygen than the adult. We all know that the venous blood from the head and superior extremities mixes intimately with the blood received from the umbilical vein & in this state the whole mass is circulated over the whole system, the quantity of blood from those parts is admitted to be large; but the whole mass appears as highly arterial as it respects color as that of the adult. Now unless it be extremely pure it must act as a stimulus being a foreign body; this stimulus acting on the accumulated excitability of the fœtus (for such is believed to be the case)

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a degree of excitement / the effect of stimulus acting on excitability / must follow constantly threatening abortion or even disorganization. — But if the large portion of oxygen which the fœtus receives is intended to remedy the effects which must follow from the admixture of impure venous & pure arterial blood, this increase of excitability cannot take place. But I presume from the view given of the fœtus as it respects the influence of oxygen on it, that neither of these theories will be contended for. —

I have now concluded my remarks on Animal Life. I have not considered it the self originated power of some, nor the intelligent perceptive principle of others. I have only expressed the difficulties which present themselves when considering it as an effect. I view the projectors of that theory as men claim the respect, & admiration of the world. For they must be viewed the benefactors of mankind. The science of

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Medicine has gained from them a certainty of which it was long destitute of; and its imperfections are fast fading away. Here would I now express my sincerest gratitude, for the advantages I have enjoyed at this school. Advantages, which, the best talents, of the best men can only afford. I leave them with regret the most sincere. The mind loves to linger where it can ask & be satisfied. Yes richly satisfied ~~with~~ from such sources of intellectual bounty. In the practice of my profession, every cure will bring to mind the sources of my instruction. Should I be asked by any one on my return home, where is the best source of medical instruction. I shall point to him this rival of Europes best schools. And tell him there is a source of wisdom and science where medical ambition can be thoroughly satisfied. —

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